

Correlating Atmospheric Data

OBJECTIVES

1. Students will examine data presented on several different graphs to explain anomalies and make correlations.
2. Students will make and test hypotheses about atmospheric data collected aboard the NOAA ship Ronald H. Brown research cruise.

AGE

Grades 9-12

TIME ALLOWANCE

2-3 hours

MATERIALS

Overhead transparencies of the graphs included with this lesson

INSTRUCTION:

1. Teacher will explain to students that the graphs they will be viewing show data collected aboard the NOAA ship Ronald H. Brown at 10°N latitude, 95° W longitude.
2. Teacher will display the solar radiation graph, and explain that measurements of incoming solar radiation were made just above the ocean surface. The numbers on the x-axis represent Julian calendar days of the year.

Discussion question for students: Between Julian days 255 and 267 (September 12-24, 2001), are there any days with significantly different solar radiation values?

Expected responses: Students should recognize that days 261, 262, 265 and 267 experienced significantly less incoming solar radiation compared to the other days presented on the graph.

3. Students will write 2-3 hypotheses in their notebooks that might explain why there was less solar radiation reaching the ocean surface on those particular days.
4. Teacher will display the rainfall graph for the same time period.

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Discussion question for students: Between Julian days 255 and 267 (September 12-24, 2001), are there any days with significantly more rainfall than the other days presented on the graph?

Expected responses: Students should recognize that days 260, 261, 262, 265 and 267 were the only days that experienced any significant amount of rainfall.

5. Students will write 2-3 paragraphs in their notebook describing whether viewing the rainfall graph supported or negated the hypotheses they developed previously. How do they know that their hypotheses have been supported or negated? Do they have a new hypothesis about why the solar radiation was so low on some days? Student writing should demonstrate critical thinking.

6. Teacher will display the Ocean Temperature vs. Air Temperature graph.

Discussion question for students: Between Julian days 255 and 267 (September 12-24, 2001), are there any days with significant fluctuations in the air temperature?

Expected responses: Students should recognize that days 259, 260, 262, 264 and 267 experienced fluctuations of at least 3-4° C.

7. Based on the revised hypothesis students generated in step 5, how does air temperature data add to the overall picture of atmospheric conditions during this time period?
8. Wind speed graph included in this lesson can be used for additional correlation, if time permits. Otherwise, skip to the next step.
9. In their notebooks, students will answer the following question:

If you were a scientist or crew member aboard the Ronald H. Brown research vessel between Julian days 255 and 267 (September 12-24, 2001), what weather and atmospheric conditions would you have observed? Specify which days you would have observed each of the conditions you list.

10. Teacher will collect student writings, and read a few selected ones to the class to generate discussion about their accuracy.

EVALUATION / ASSESSMENT

Teacher will circulate among students to provide assistance and make sure they are on track with writing assignments. Students are expected to participate in discussions, and demonstrate critical thinking on all writing.